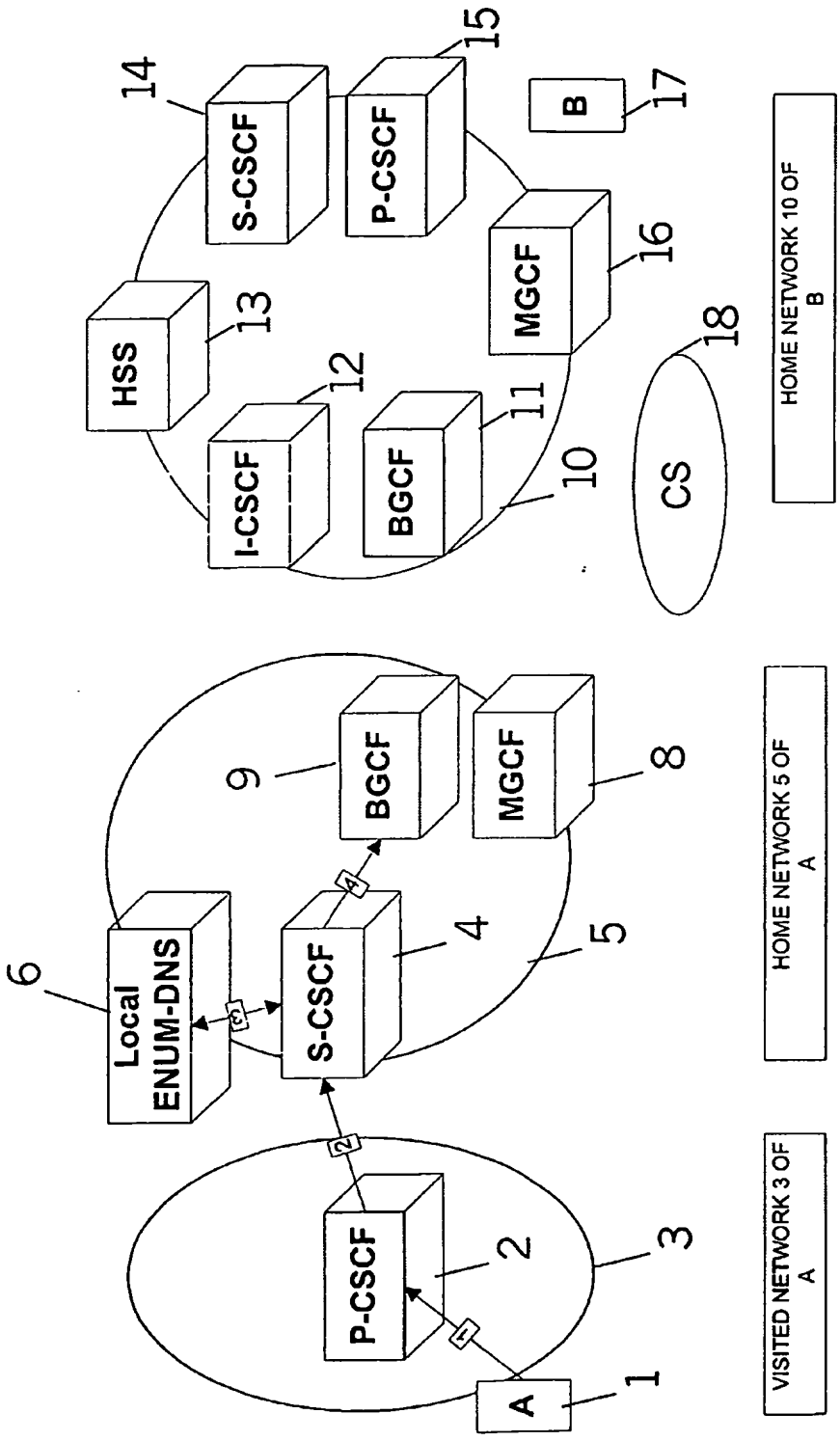
VISITED NETWORK 3 OF A
HOME NETWORK 5 OF A
HOME NETWORK 10 OF B
A
P-CSCF
Local ENUM-DNS
S-CSCF
BGCF
MGCF
HSS
I-CSCF
BGCF
MGCF
S-CSCF
P-CSCF
B
CS
1
2
3
4
5
6
8
9
10
11
12
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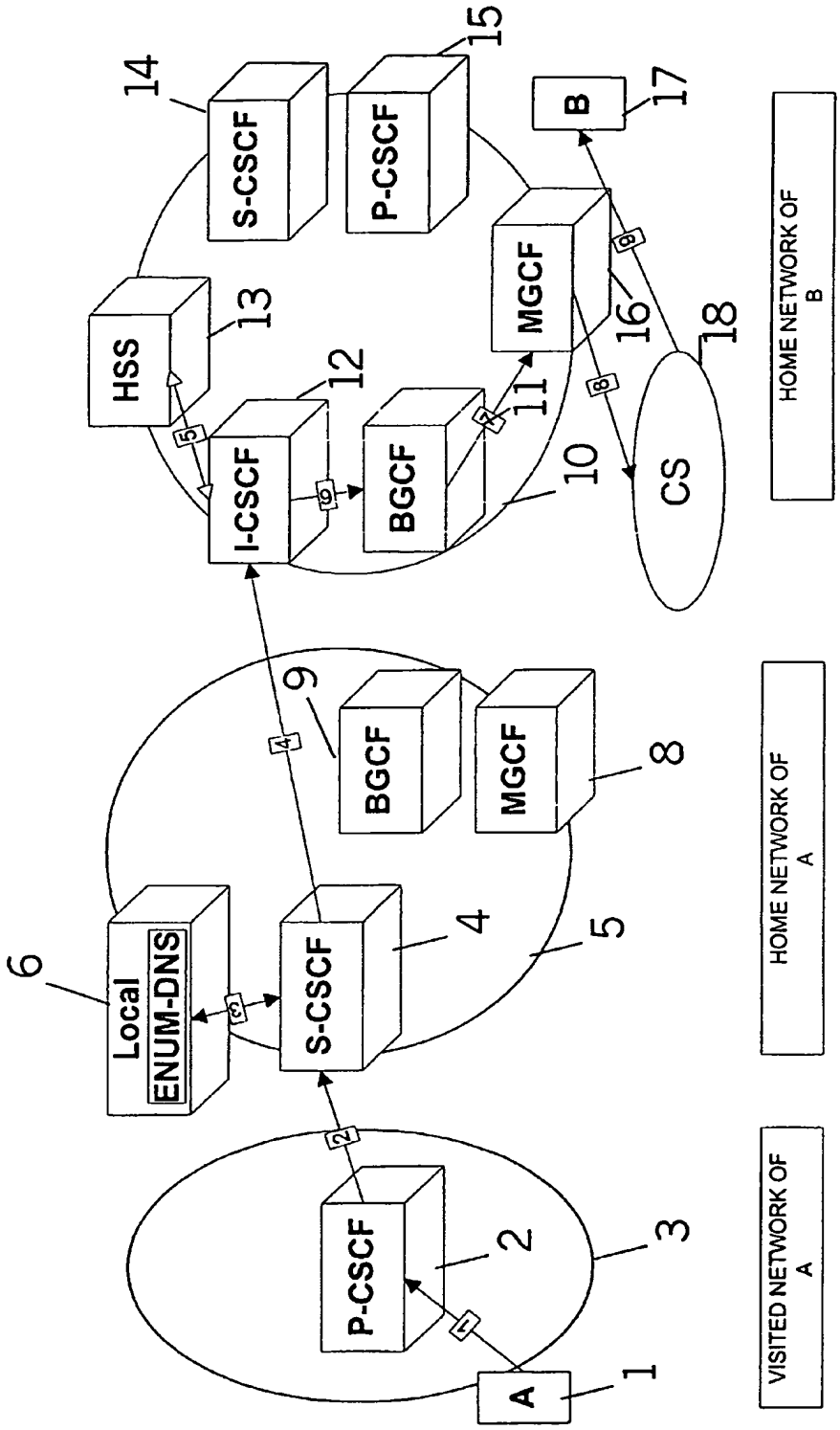
14
15
16
17
18

FIG. 1


A
P-CSCF
S-CSCF
Local ENUM-DNS
BGCF
MGCF
I-CSCF
BGCF
HSS
S-CSCF
P-CSCF
MGCF
B
CS
1
2
3
4
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18
VISITED NETWORK OF A
HOME NETWORK OF A
HOME NETWORK OF B

FIG. 2

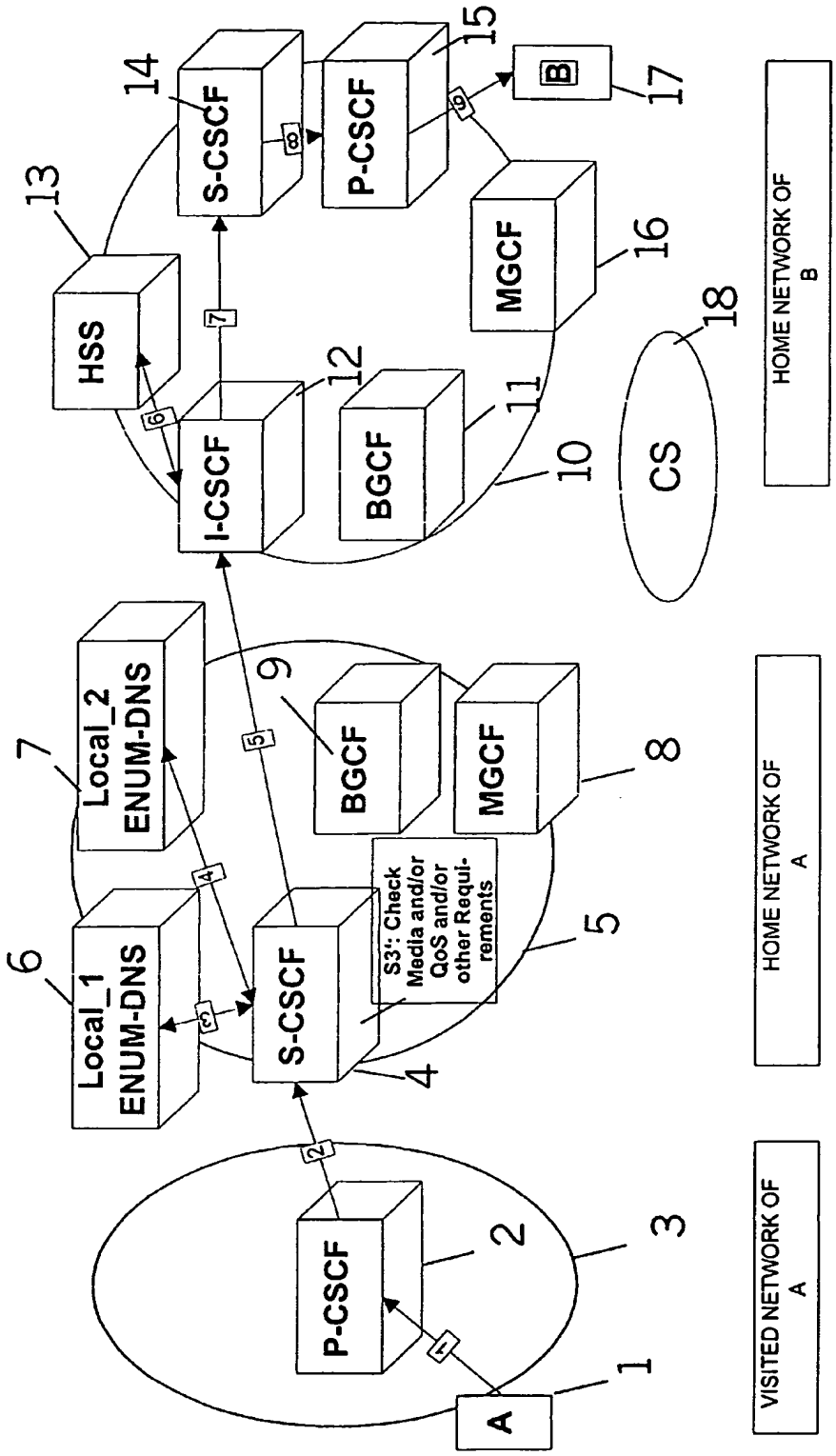
A
P-CSCF
S-CSCF
Local_1 ENUM-DNS
Local_2 ENUM-DNS
S3': Check Media and/or QoS and/or other Requi-rements
BGCF
MGCF
I-CSCF
HSS
S-CSCF
P-CSCF
B
MGCF
BGCF
CS
VISITED NETWORK OF A
HOME NETWORK OF A
HOME NETWORK OF B
1
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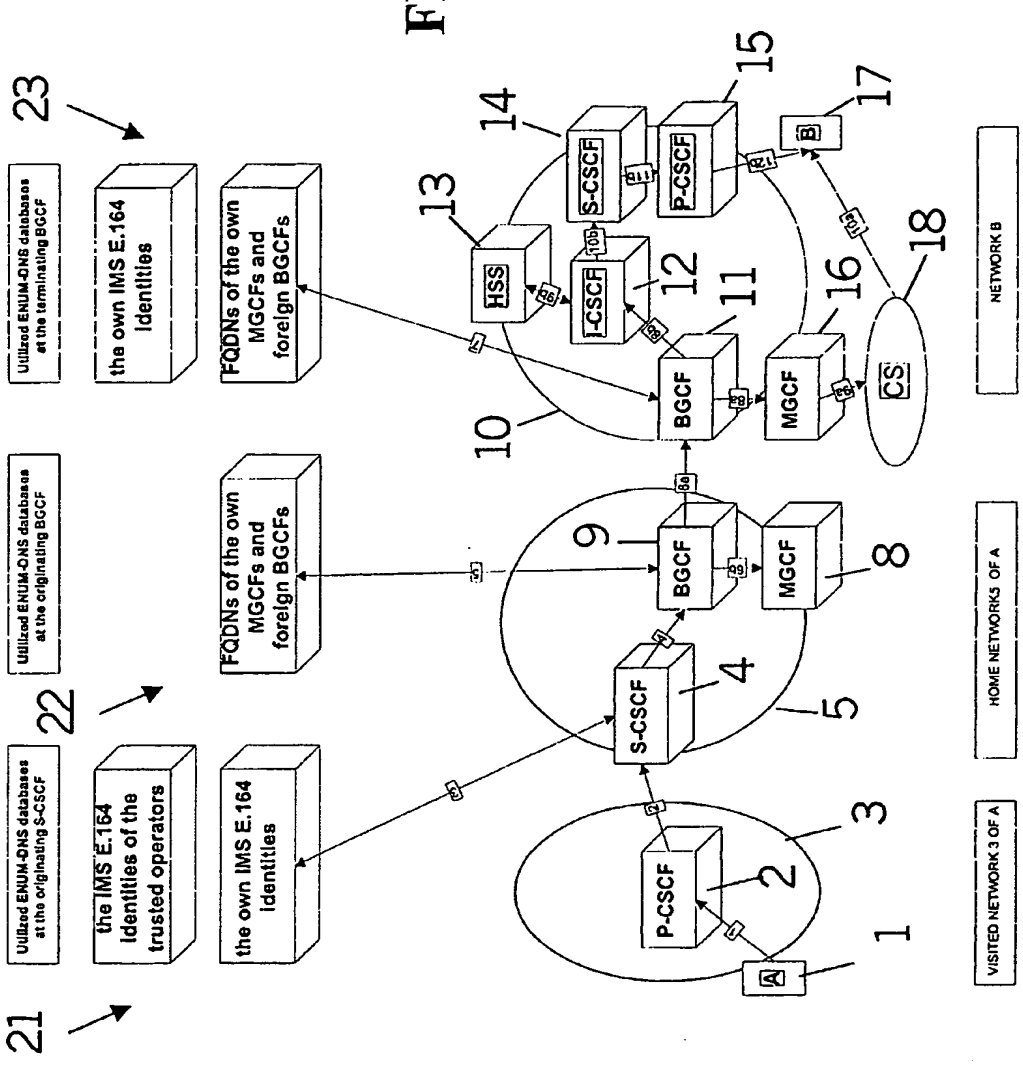
FIG. 3

FIG. 4


21
22
23
Utilized ENUM-DNS databases at the originating S-CSCF
the IMS E.164 Identities of the trusted operators
the own IMS E.164 Identities
Utilized ENUM-DNS database at the originating BGCF
FQDNs of the own MGCFs and foreign BGCFs
Utilized ENUM-DNS databases at the terminating BGCF
the own IMS E.164 Identities
FQDNs of the own MGCFs and foreign BGCFs
VISITED NETWORK 3 OF A
HOME NETWORKS OF A
NETWORK B
A
P-CSCF
S-CSCF
BGCF
MGCF
HSS
I-CSCF
S-CSCF
P-CSCF
B
CS
1
2
3
4
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8
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18

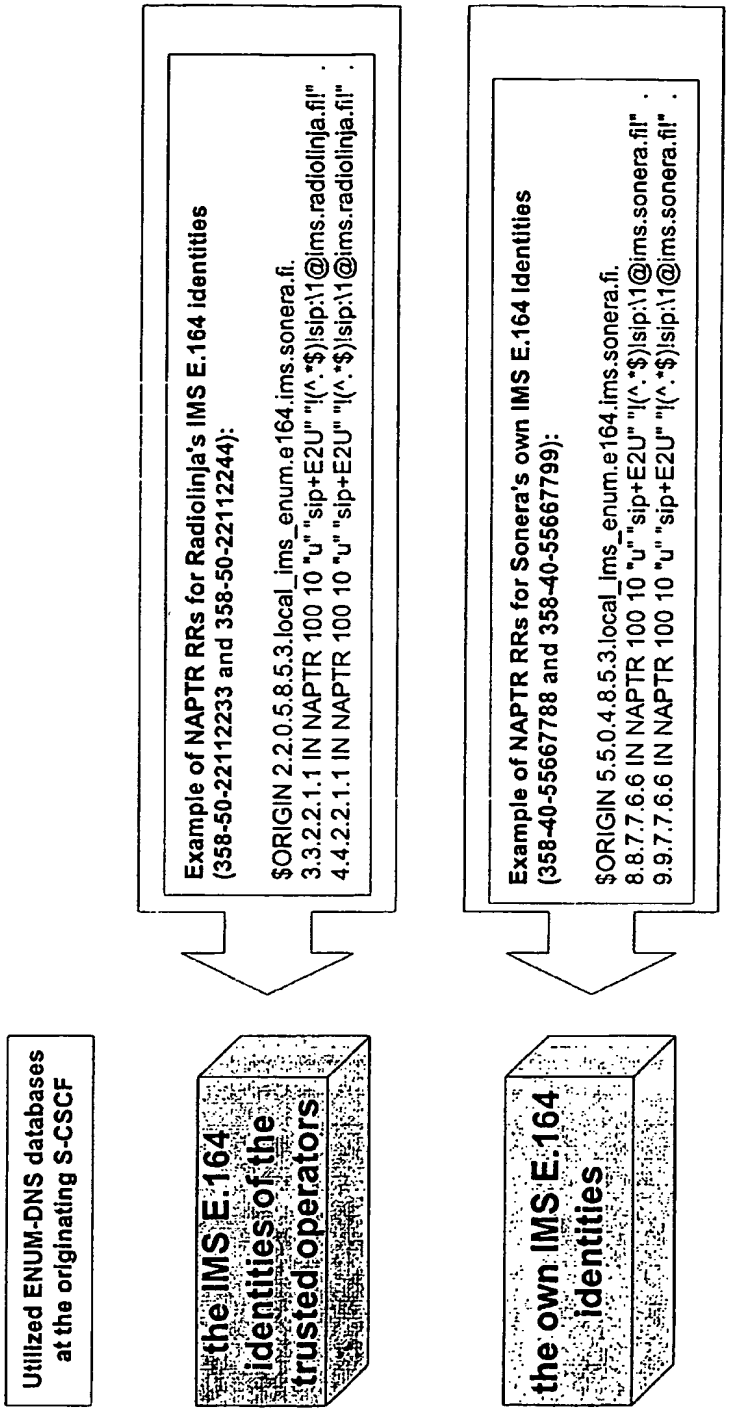

Utilized ENUM-DNS databases at the originating S-CSCF
the IMS E.164 identities of the trusted operators
Example of NAPTR RRs for Radiolinja's IMS E.164 identities (358-50-22112233 and 358-50-22112244):
$ORIGIN 2.2.0.5.8.5.3.local_ims_enum.e164.ims.sonera.fi.
3.3.2.2.1.1 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@ims.radiolinja.fi" .
4.4.2.2.1.1 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@ims.radiolinja.fi" .
the own IMS E.164 identities
Example of NAPTR RRs for Sonera's own IMS E.164 Identities (358-40-55667788 and 358-40-55667799):
$ORIGIN 5.5.0.4.8.5.3.local_ims_enum.e164.ims.sonera.fi.
8.8.7.7.6.6 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@ims.sonera.fi" .
9.9.7.7.6.6 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@ims.sonera.fi" .

FIG. 5

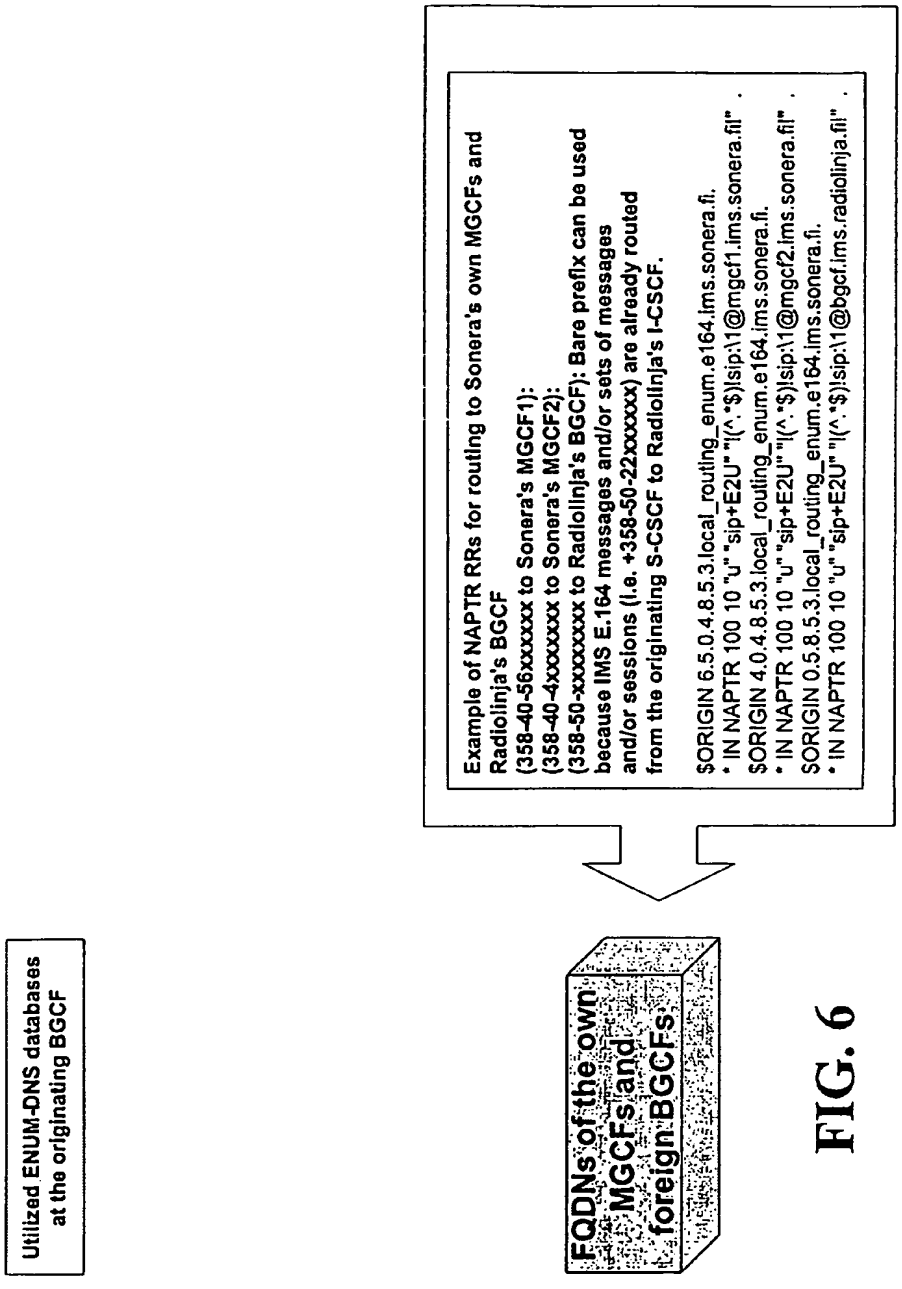

Example of NAPTR RRs for routing to Sonera's own MGCFs and Radiolinja's BGCF
(358-40-56xxxxxx to Sonera's MGCF1):
(358-40-4xxxxxxx to Sonera's MGCF2):
(358-50-xxxxxxx to Radiolinja's BGCF): Bare prefix can be used because IMS E.164 messages and/or sets of messages and/or sessions (I.e. +358-50-22xxxxxx) are already routed from the originating S-CSCF to Radiolinja's I-CSCF.
$ORIGIN 6.5.0.4.8.5.3.local_routing_enum.e164.ims.sonera.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@mgcf1.ims.sonera.fi" .
$ORIGIN 4.0.4.8.5.3.local_routing_enum.e164.ims.sonera.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@mgcf2.ims.sonera.fi" .
$ORIGIN 0.5.8.5.3.local_routing_enum.e164.ims.sonera.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)!sip:\1@bgcf.ims.radiolinja.fi" .
FQDNs of the own MGCFs and foreign BGCFs
Utilized ENUM-DNS databases at the originating BGCF

FIG. 6

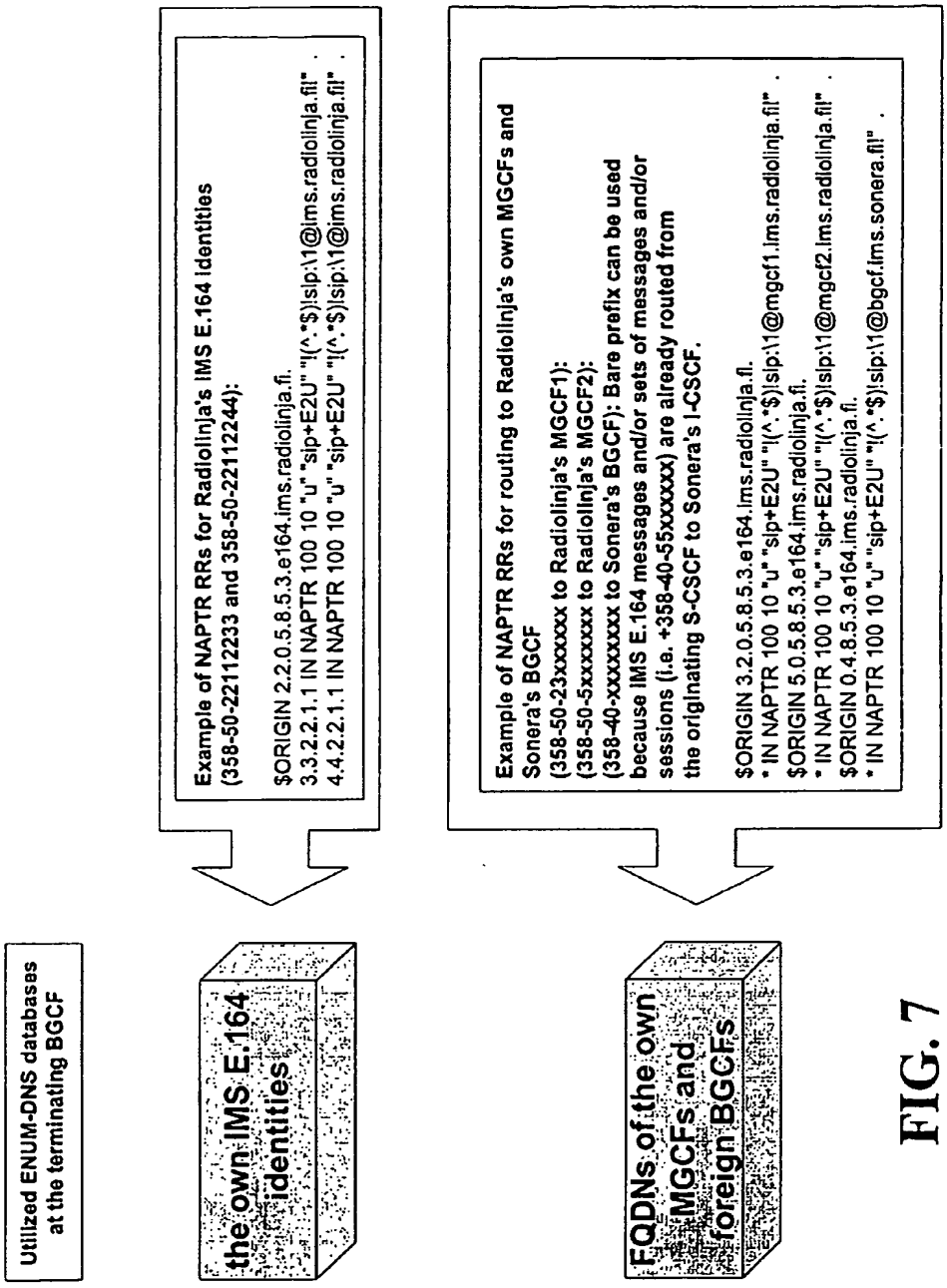
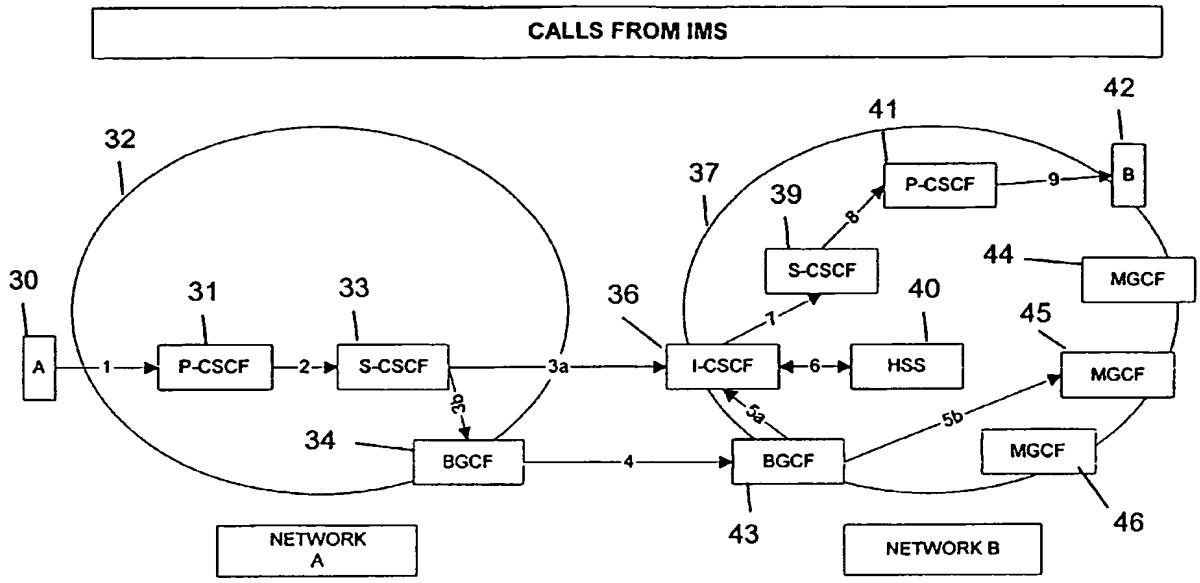

Utilized ENUM-DNS databases at the terminating BGCF
the own IMS E.164 identities
Example of NAPTR RRs for Radiolinja's IMS E.164 identities (358-50-22112233 and 358-50-22112244):
$ORIGIN 2.2.0.5.8.5.3.e164.ims.radiolinja.fi.
3.3.2.2.1.1 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)sip:\1@ims.radiolinja.fi" .
4.4.2.2.1.1 IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)sip:\1@ims.radiolinja.fi" .
FQDNs of the own MGCFs and foreign BGCFs
Example of NAPTR RRs for routing to Radiolinja's own MGCFs and Sonera's BGCF
(358-50-23xxxxxx to Radiolinja's MGCF1):
(358-50-5xxxxxxx to Radiolinja's MGCF2):
(358-40-xxxxxxxx to Sonera's BGCF): Bare prefix can be used because IMS E.164 messages and/or sets of messages and/or sessions (i.e. +358-40-55xxxxx) are already routed from the originating S-CSCF to Sonera's I-CSCF.
$ORIGIN 3.2.0.5.8.5.3.e164.ims.radiolinja.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)sip:\1@mgcf1.ims.radiolinja.fi" .
$ORIGIN 5.0.5.8.5.3.e164.ims.radiolinja.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)sip:\1@mgcf2.ims.radiolinja.fi" .
$ORIGIN 0.4.8.5.3.e164.ims.radiolinja.fi.
* IN NAPTR 100 10 "u" "sip+E2U" "!(^.*$)sip:\1@bgcf.ims.sonera.fi" .

FIG. 7

E.164 routing within IMS



ROUTING with logical name:

1
2
S-CSCF find out that it is not E.164 but a logical name and gets FQDN of I-CSCF from the logical name.
3a
6
7
8
9

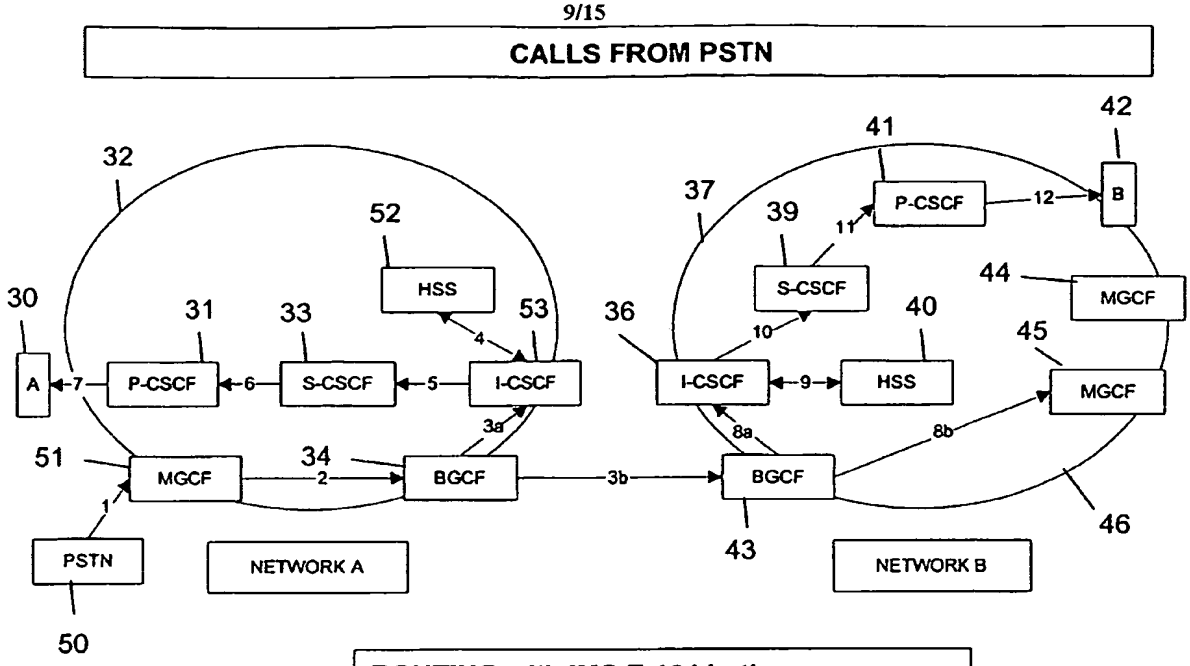
ROUTING with IMS E.164:

1
2
S-CSCF find out that it is E.164 and routes the call to a BGCF in the own network.
3b
4
BGCF in the target network finds out that it is IMS E.164 and routes the call to I-CSCF.
5a
6
7
8
9

ROUTING with non IMS E.164:

1
2
S-CSCF find out that it is E.164 and routes the call to a BGCF in the own network.
3b
4
BGCF in the target network finds out that it is not IMS E.164 and routes the call to one of the own MGCFs.
5b

FIG. 8



ROUTING with IMS E.164 in the own
1
2
BGCF find out that I-CSCF takes care of the number.
3a
4
5
6
7

ROUTING with IMS E.164 to another
1
2
BGCF find out that BGCF in another network takes care of the number.
3b
BGCF find out that I-CSCF takes care of the number.
8a
9
10
11
12

ROUTING with non IMS E.164 to another
1
2
BGCF find out that BGCF in another network takes care of the number.
3b
BGCF find out the MGCF that takes care of the number.
8b

FIG. 9

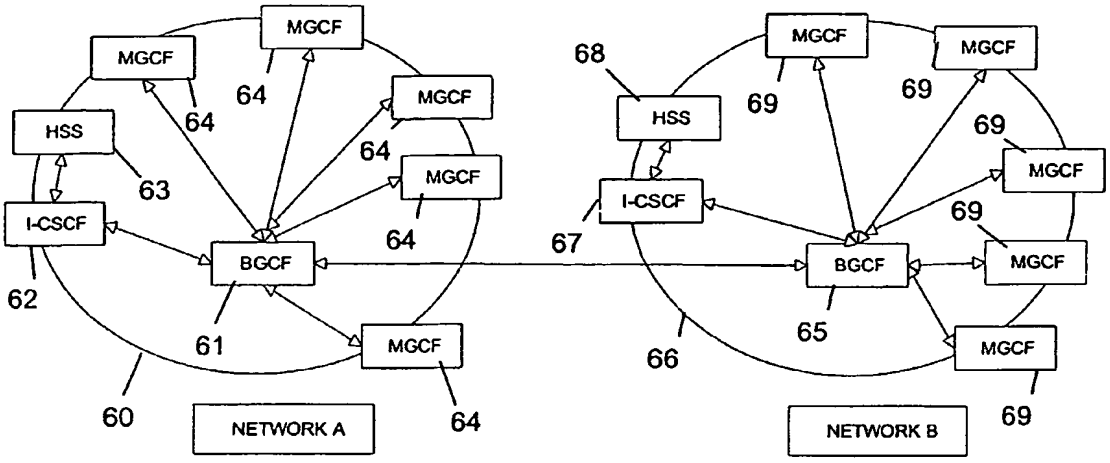

MGCF
MGCF
64
MGCF
HSS
64
63
64
MGCF
I-CSCF
64
BGCF
62
61
MGCF
60
NETWORK A
64
68
MGCF
MGCF
HSS
69
69
69
MGCF
I-CSCF
67
69
BGCF
MGCF
65
66
MGCF
NETWORK B
69

FIG. 10

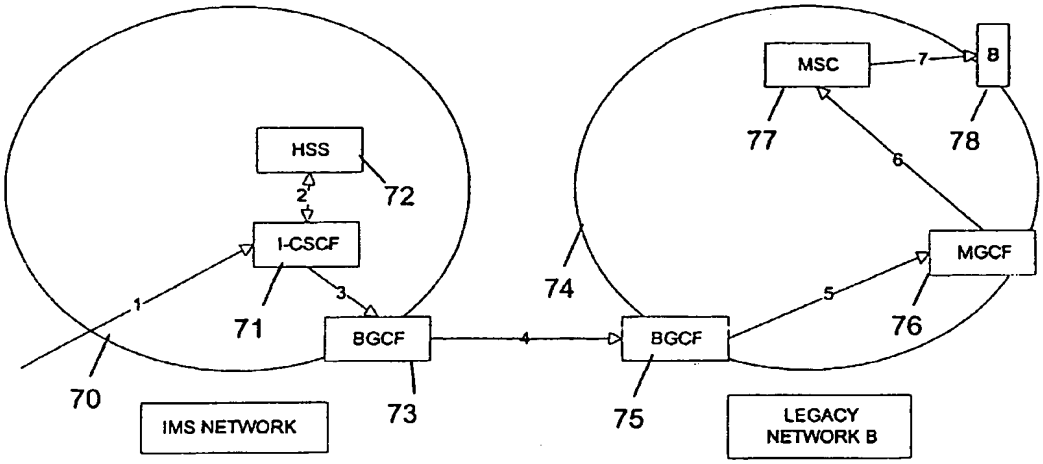

HSS
72
2
I-CSCF
1
71
3
BGCF
70
IMS NETWORK
73
4
BGCF
75
LEGACY NETWORK B
74
MSC
7
B
77
78
6
MGCF
5
76

FIG. 11

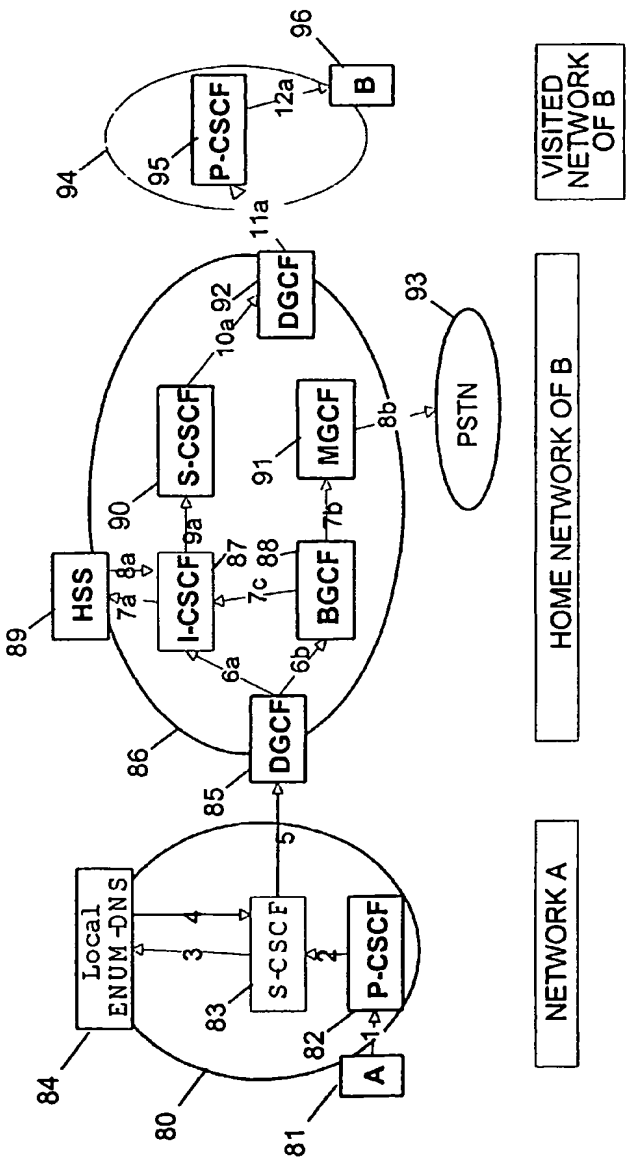

VISITED NETWORK OF B
HOME NETWORK OF B
NETWORK A
B
P-CSCF
DGCF
S-CSCF
MGCF
PSTN
HSS
I-CSCF
BGCF
DGCF
Local ENUM-DNS
S-CSCF
P-CSCF
A
96
94
95
12a
11a
92
10a
93
90
91
8b
89
8a
7a
9a
87
88
7b
7c
6a
6b
86
85
5
84
4
3
2
1
83
82
80
81

FIG. 12

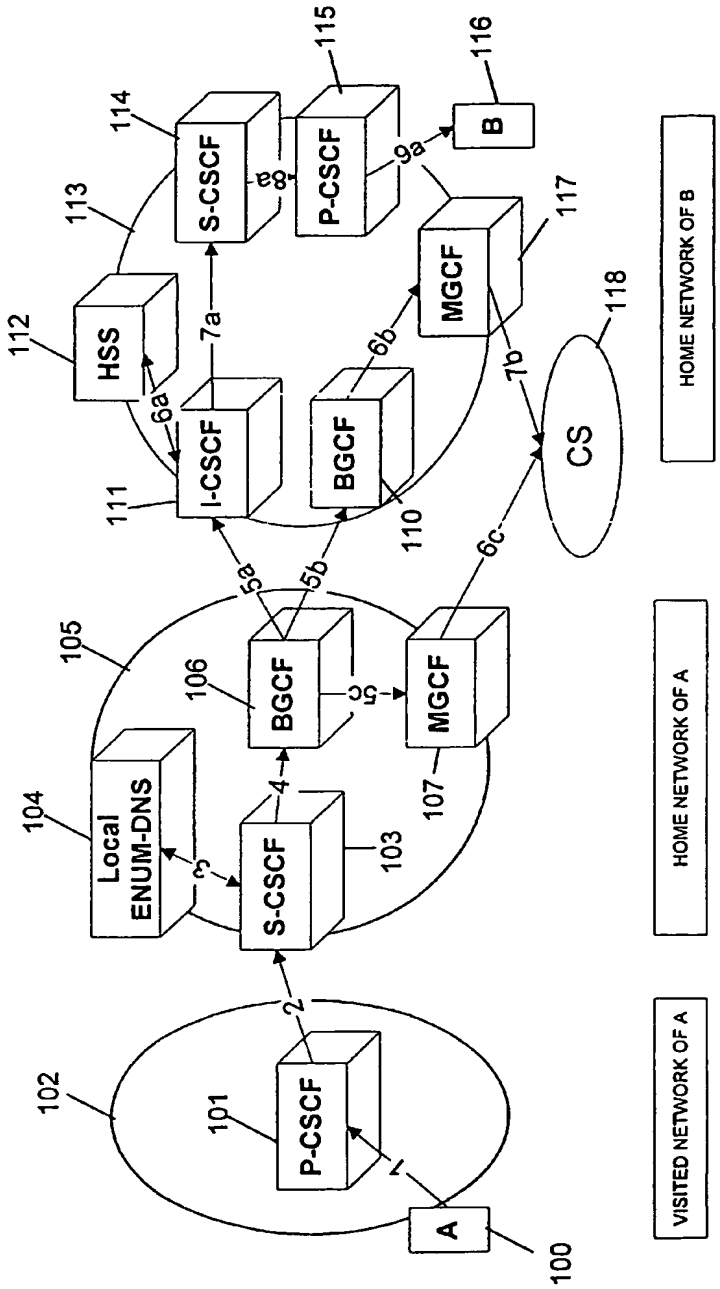

VISITED NETWORK OF A
HOME NETWORK OF A
HOME NETWORK OF B
A
100
P-CSCF
101
102
1
2
S-CSCF
103
Local ENUM-DNS
104
3
4
BGCF
106
MGCF
107
105
5a
5b
5c
I-CSCF
111
BGCF
110
HSS
112
6a
7a
S-CSCF
114
113
8a
P-CSCF
115
9a
B
116
MGCF
117
6b
7b
CS
118
6c

FIG. 13

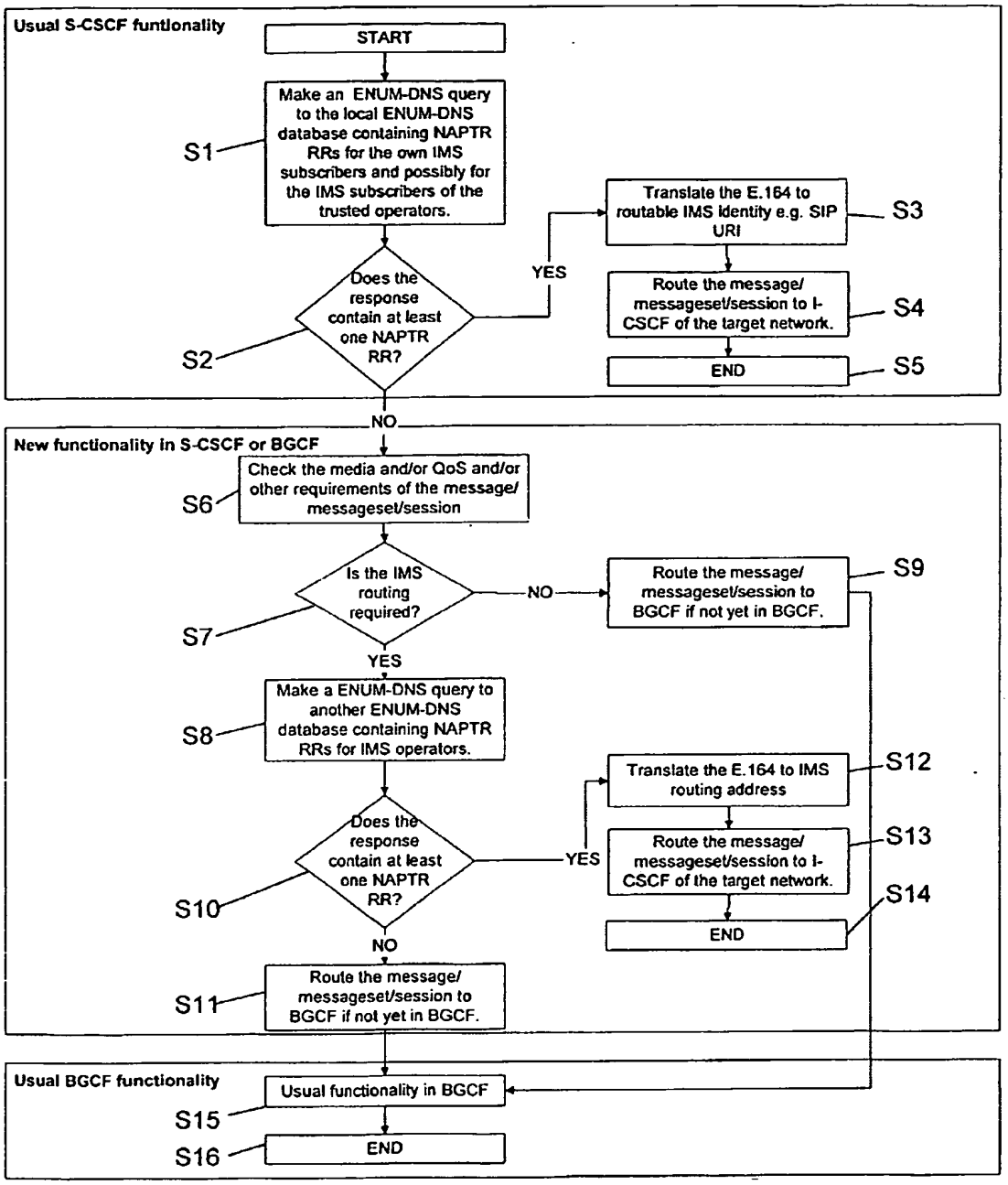

Usual S-CSCF funtionality
START
Make an ENUM-DNS query to the local ENUM-DNS database containing NAPTR RRs for the own IMS subscribers and possibly for the IMS subscribers of the trusted operators.
S1
Does the response contain at least one NAPTR RR?
S2
YES
Translate the E.164 to routable IMS identity e.g. SIP URI
S3
Route the message/ messageset/session to I-CSCF of the target network.
S4
END
S5
NO
New functionality in S-CSCF or BGCF
Check the media and/or QoS and/or other requirements of the message/ messageset/session
S6
Is the IMS routing required?
S7
NO
Route the message/ messageset/session to BGCF if not yet in BGCF.
S9
YES
Make a ENUM-DNS query to another ENUM-DNS database containing NAPTR RRs for IMS operators.
S8
Does the response contain at least one NAPTR RR?
S10
YES
Translate the E.164 to IMS routing address
S12
Route the message/ messageset/session to I-CSCF of the target network.
S13
END
S14
NO
Route the message/ messageset/session to BGCF if not yet in BGCF.
S11
Usual BGCF functionality
Usual functionality in BGCF
S15
END
S16

FIG. 14

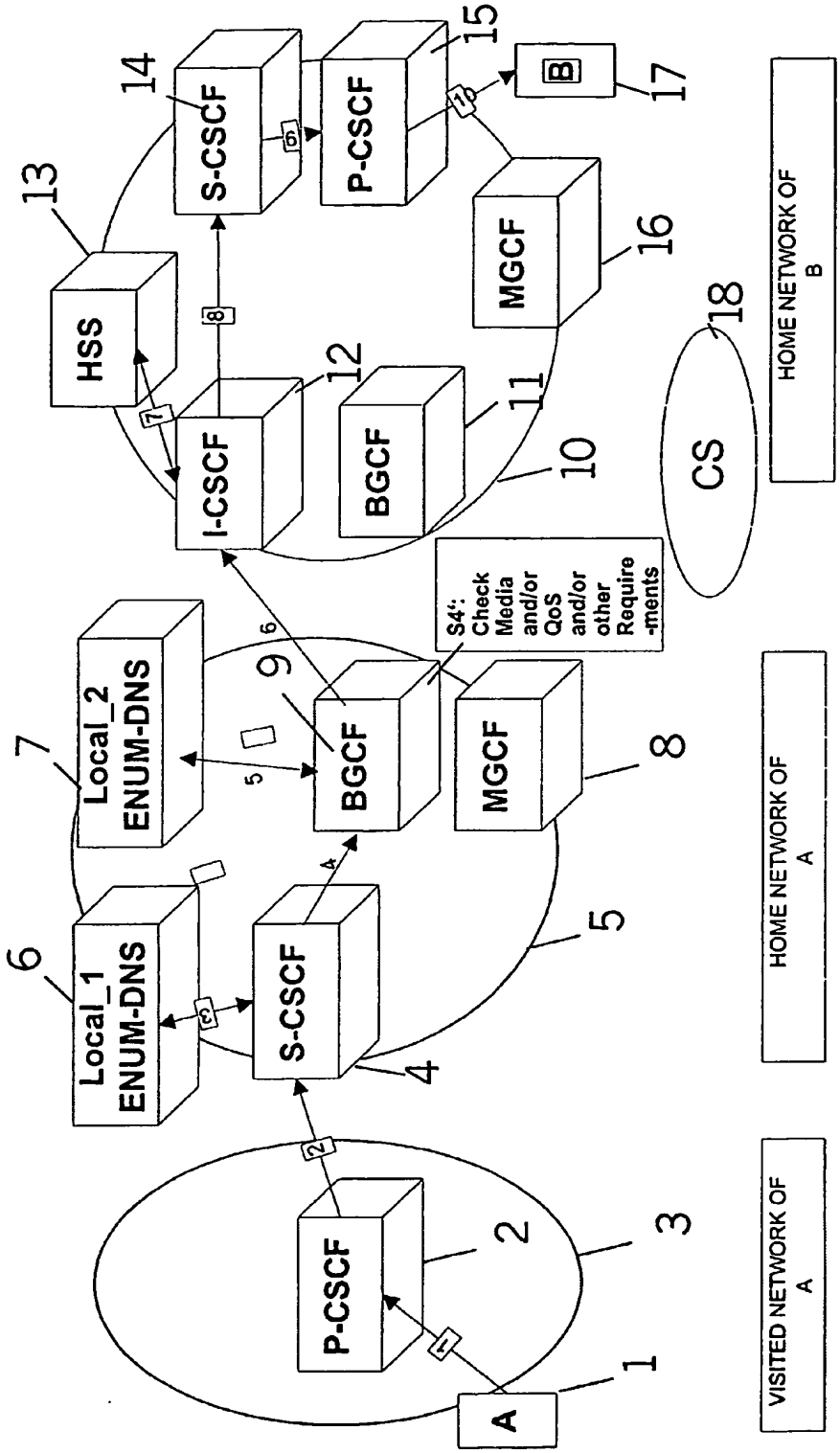

A
P-CSCF
S-CSCF
Local_1 ENUM-DNS
Local_2 ENUM-DNS
BGCF
MGCF
S4': Check Media and/or QoS and/or other Require -ments
I-CSCF
BGCF
HSS
S-CSCF
P-CSCF
MGCF
B
CS
VISITED NETWORK OF A
HOME NETWORK OF A
HOME NETWORK OF B
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FIG. 15